



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

HOLGER KUNSTLE ET AL.

Serial No.: 09/612,166

Filed: July 8, 2000

For: LOW-EMISSION ADHESIVES BASED ON AN AQUEOUS,
PROTECTIVE-COLLOID-FREE DISPERSIONS OF VINYL
ACETATE-ETHYLENE COPOLYMERS

Attorney Docket No.: WAS 0431 PUS

Group Art Unit: 1733

Examiner: John J. Gallagher

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APPEAL BRIEF

Box AF
Commissioner for Patents
United States Patent and Trademark Office
Washington, D.C. 20231

Sir:

Appellants appeal the Final Rejection of claims 1 - 16, all the claims of the above-identified application. This brief is submitted in triplicate, together with the fee of \$320.00 under 37 C.F.R. §§ 1.192(a) and 1.17(c).

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I. REAL PARTY IN INTEREST

The real party in interest is Wacker-Chemie GmbH by virtue of assignment from the inventors dated June 13, 2000, and recorded at reel/frame 010928/0229.

CERTIFICATE OF MAILING UNDER 37 C.F.R. § 1.8

I hereby certify that this paper, including all enclosures referred to herein, is being deposited with the United States Postal Service as first-class mail, postage pre-paid, in an envelope addressed to: Box AF, Commissioner for Patents, United States Patent and Trademark Office, Washington, D.C. 20231 on:

January 17, 2003
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William G. Conger
Name of Person Signing

Signature

II. RELATED APPEALS AND INTERFERENCES

Appellants, Appellants' assignee, and Appellants' legal representatives are unaware of any other appeal or interference which will directly affect or be directly affected by or have a bearing on the Boards Decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 1 - 16 are pending in this application. Claims 1 -16, all the claims, are the subject of this appeal.

IV. STATUS OF AMENDMENTS

Claims 3, 10, 14, 15, and 16 were amended following Final Rejection. Claim 17 was cancelled. The claim amendments were entered.

V. SUMMARY OF THE INVENTION

The present invention pertains to low-emission adhesives (claim 1 as filed; specification page 1, line 8) based on aqueous, protective-colloid free polymer dispersions or dispersion powders prepared therefrom of vinyl ester-ethylene copolymers (claim 1 as filed) containing free carboxylic acid groups (claim 1 as filed; specification page 3, lines 9-11; specification page 4, lines 13-19) prepared by aqueous emulsion polymerization, in the presence of an emulsifier, (claim 1 as filed; specification page 2, lines 32-34), of a comonomer mixture comprising:

- a) from 5 to 50% by weight of ethylene,
- b) from 20 to 80% by weight of at least one vinyl ester selected from the group consisting of vinyl esters of unbranched or branched carboxylic acids

acids having 1 to 9 carbon atoms whose homopolymers have a glass transition temperature $T_g > 0^\circ\text{C}$,

- c) from 5 to 70% by weight of at least one vinyl ester selected from the group consisting of a vinyl ester of a branched carboxylic acids having 8 to 13 carbon atoms whose homopolymers have a glass transition temperature $T_g < 0^\circ\text{C}$,
- d) from 0.5 to 10% by weight of at least one ethylenically unsaturated monocarboxylic or dicarboxylic acid having 3 or 4 carbon atoms,
- e) from 0 to 10% by weight of at least one ethylenically unsaturated, hydroxyalkyl-functional comonomer,
- f) from 0 to 10% by weight of a further mono- or polyethylenically unsaturated comonomer,

(Claim 1 as filed; specification page 2, line 35 to page 3), with the proviso that the copolymers are devoid of moieties derived from (meth)acrylate alkyl esters (specification page 1, line 31 to page 2, line 12).

VI. ISSUES

The principle issue on appeal is succinctly stated as follows:

Are claims 1-16 anticipated within the meaning of 35 U.S.C. § 102(b)?

There are several sub-issues which will be discussed with regard to this principle issue.

VII. GROUPING OF CLAIMS

The claims stand or fall together.

VIII. ARGUMENT

The present invention is directed to an improvement of adhesives whose principle uses are as pressure sensitive adhesives and flooring adhesives. As disclosed on pages 1 and 2 of the specification, acrylate alkyl ester-containing polymer dispersions have been long used for these purposes. However, it has now been discovered that such adhesives, when used on alkaline substrates (e.g. cement or concrete), give rise to volatile alkanol emissions. Such emissions are undesirable, and persist for weeks, months, and even years. The problem solved by Appellants was to produce an adhesive in the form of a polymer dispersion or a redispersible polymer powder prepared therefrom, which does not emit volatile alkanols, yet which exhibits acceptable tack, peel strength, and cohesiveness, *i.e.*, acceptable adhesive properties. Appellants found that simply eliminating (meth)acrylate alkyl esters from the formulations did not achieve these desired results. Although emissions were eliminated, adhesive quality suffered greatly. Compare, for example, Comparative Examples C13-C15, which employ ethylhexyl acrylate and hence have emission problems, with Comparative Examples C12 and C13 which do not have any emission problem, but are highly deficient in adhesive properties (Table 1, page 17).

Appellants found that the goal of eliminating volatile alkanol emissions while still providing satisfactory adhesive properties could be met by copolymers of ethylene, small amounts of a carboxylic acid-functional monomer, and two different vinyl ester monomers: a first vinyl ester derived from a branched or unbranched C₁₋₉ carboxylic acid whose homopolymers exhibit a Tg (glass transition temperature) greater than 0°C, and a second vinyl ester derived from a branched C₈₋₁₃ carboxylic acid whose homopolymers have a Tg < 0°C. The claims require, in their broadest aspect (*i.e.* claim 1) from 20-80% by weight of the first vinyl ester (Tg > 0°C) and 5-70% by weight of the second vinyl ester (derived from branched carboxylic acid, Tg < 0°C).

The claims have been rejected over *Weissgerber et al.*, U.S. Patent 4,997,879 (“*Weissgerber*”), commonly assigned, under 35 U.S.C. § 102(b).

Weissgerber does not address the problem solved by Appellants.¹ Rather, *Weissgerber* acknowledges that state of the art (at that time) adhesives based on ethylene, C₄₋₁₂ alkyl acrylates, and vinyl acetate suffer from poor adhesion to certain substrates, particularly glass. (See *Weissgerber* at column 1, lines 10-25.) The problem solved by *Weissgerber* is one of increasing adhesive strength to such substrates (*Weissgerber*, column 1, lines 28-34). *Weissgerber* accomplished this result by copolymerizing a small proportion of ethylenically unsaturated hydroxyalkyl-functional compounds, for example hydroxyethyl acrylate and hydroxypropyl acrylate, along with these traditional monomers. *Weissgerber* at column 2, lines 15-24.

The adhesives disclosed by *Weissgerber* are set forth compositionally at column 1, lines 54-65:

- (a) 10-45 % by weight of ethylene
 - (b) 0-25 % by weight of acrylic ester(s)
 - (c) 40-89 % by weight of vinyl ester(s)
 - (d) 0.5-4 % by weight of ethylenically unsaturated carboxylic acids preferably with 3-4 carbon atoms
 - (e) 0.5-10% by weight of ethylenically unsaturated hydroxyalkylfunctional compounds
 - (f) 0-0.3 % (meth)acrylamide
 - (g) 0-10 % ethylenically unsaturated sulfates and sulfonates or polyethylenically unsaturated compounds
- in the presence of 1 to 6 % by weight, referred to the comonomer mixture, of at least one emulsifier.

¹ It is recognized that the problem addressed and solved is not ordinarily relevant in rejections under 35 U.S.C. § 102. However, see the discussion *infra*.

Several monomers of *Weissgerber* are in common with those of Appellants, and require no detailed discussion.² The present claims, for example, require a), ethylene (*Weissgerber*'s monomer a) also); d), ethylenically unsaturated mono- or dicarboxylic acids (comparable to *Weissgerber*'s monomer d))³; optional monomer e) (comparable to *Weissgerber*'s monomers f) and g)).

However, it is critical to Appellants' adhesives that first, no alkyl (meth)acrylate monomers be present, and second, and most importantly, that Appellants' adhesives contain 20-80 weight percent of a first vinyl ester monomer b) which is a vinyl ester of a branched or unbranched C₁₋₉ carboxylic acid, homopolymers of which have a Tg > 0°C, and 5-70 weight percent of a second vinyl ester c) of a branched C₈₋₁₃ carboxylic acid, homopolymers of which have a Tg < 0°C. It is Appellants' position that *Weissgerber* does not disclose, nor does he teach or suggest, any of these limitations, and thus the claims are not anticipated by *Weissgerber*.

The touchstone of patentability over the prior art is whether the prior art places the claimed invention in the hands of the public. *In re Brown*, 144 USPQ 245 (CCPA 1964); *In re Arkley*, 172 USPQ 524 (CCPA 1972). This is so whether the rejection is one for lack of novelty under 35 U.S.C. § 102 or for obvious subject matter under 35 U.S.C. § 103. Here, it is clear that *Weissgerber* does not place the invention in the hands of the public, and the claims are therefore patentable over *Weissgerber*. As has been established for decades, for anticipation under 35 U.S.C. § 102, the prior art disclosure must meet very stringent requirements. *In re Marshall*, 198

² It is noted that the ranges cited by *Weissgerber* and Appellant are not coextensive. However, for monomers which the two adhesives have in common, there is a rather substantial overlap. These monomers are: ethylene (the "a") monomer); unsaturated carboxylic acid (the "d") monomers); unsaturated hydroxyalkyl-functional monomers (the "e") monomers); and "other monomers" (Appellants' monomer(s) f), *Weissgerber*'s monomers f) and g)).

³ *Weissgerber* does not disclose unsaturated dicarboxylic acids, nor does he disclose the range of 0.5-10% by weight.

USPQ 344 (CCPA 1978). Each and every limitation of the claimed invention must be clearly and unambiguously disclosed.

As indicated in *In re Turlay*, 134 USPQ 355, 360 (CCPA 1962);

. . . Statements in a prior application relied on to prove anticipation must be so clear and explicit that those skilled in the art will have no difficulty in ascertaining their meaning.

Turlay at 360 (CCPA 1962), citing *In re Cramblet*, 16 USPQ 74 (CCPA 1932). The Federal Circuit has clearly stated on several occasions, that the standard for anticipation involves strict, and not merely substantial identity. *RCA Corp. v. Applied Digital Data Sys., Inc.*, 221 USPQ 385 (Fed. Cir. 1984); *Jamesbury Corp. v. Litton Industrial Products, Inc.*, 225 USPQ 253, 256 (Fed. Cir. 1985); 5 USPQ2d 1779 (Fed. Cir. 1988), *cert. denied*, 488 U.S. 828 (1988); *Trintec Industries, Inc. v. Top U.S.A. Corporation*, 63 USPQ2d 1597, 1600 (Fed. Cir. 2002).

Finally, it is also clear that a disclosure which does not necessarily result in the claimed invention, with its attendant benefits, does not anticipate. As stated by Lerner Hand, one of the nation's most respected and revered jurists:

No doctrine of patent law is better established than that a prior patent or other publication to be an anticipation must bear within its four corners adequate directions for the practice of the patent invalidated. If the earlier disclosure offers no more than a starting point for further experiments, if its teaching will sometimes succeed and sometimes fail if it does not inform the art without more how to practice the new invention, it has not correspondingly enriched the store of common knowledge and is not an anticipation.

Dewey & Almy Chem. Co. v. Mimex Co., 52 USPQ 138 (2nd Cir. 1942) (L. Hand, J.).⁴

The claimed invention requires two distinctly different vinyl esters, a first vinyl ester monomer a) which is a vinyl ester of a branched or unbranched C₁₋₉ carboxylic acid, homopolymers of which have a Tg > 0°C, and 5-70 weight percent of a second vinyl ester of a branched C₈₋₁₃ carboxylic acid, homopolymers of which have a Tg < 0°C. *Weissgerber* does not disclose any composition requiring two such distinct vinyl esters,⁵ much less in the strict manner required by the law. *Turlay, supra*; *RCA, supra*; *Jamesbury, supra*.

The text passages of *Weissgerber* which relate to vinyl esters, exclusive of the Examples (which will be discussed *infra*), are as follows:

- | | |
|----------------------|--|
| Col. 1, lines 43-44: | “vinyl esters of saturated carboxylic acids of 2 to 12 carbon atoms” |
| Col. 1, lines 56: | “40-89% by weight of vinyl ester(s)” |
| Col. 2, lines 3-8: | “Examples of component (c) are vinyl esters such as vinyl acetate, vinyl propionate, vinyl laurate and vinyl esters of Versatic acid sold by Shell AG, especially those of 10 carbon atoms. The amount of compound (c) used is 40 to 89%, preferably 55 to 80%, by weight of the monomer mixture.” |

⁴ The claimed invention is also not inherent. For rejections based on inherency, the alleged inherent claim limitations must be “‘necessarily present’, not merely probably or possibly present, in the prior art.” *Trintec, op.cit.*, at 1599. See also, *Ex parte Cyba*, 155 USPQ 756 (POBA 1966); *Ex parte Keith*, 154 USPQ 320 (POBA 1966); *Ex parte McQueen*, 123 USPQ 37 (POBA 1958). Many combinations of monomers which completely meet the description of the invention in *Weissgerber* and completely satisfy his claim requirements, fail to satisfy the requirements of the present invention’s claims. It is thus clear that there is no inherent anticipation. If no inherent anticipation, how can there be anticipation of any kind?

⁵ Nor does *Weissgerber* suggest use of these two distinct vinyl esters.

Col. 6, lines 19-20: “vinyl esters of saturated carboxylic acids of 2 to 12 carbon atoms”
(claim 1)

Col. 6, line 32 “40-89% by weight of vinyl esters.”
(claim 1)

Where, in these citations from *Weissgerber*, is ANY disclosure which strictly, clearly, and unambiguously states that two distinct classes of vinyl esters must be used in the proportions required? The Office states that “provision is made for the use of a mixed vinyl ester (e.g. vinyl acetate and a vinyl versatate of e.g. 10 carbon atoms) component.” Office Action of June 18, 2002, Paper No. 9, p. 3, and “with two specified monomers WHEN USED being preferred.” Advisory Action of October 1, 2002, Paper No. 11, p. 2 (emphasis in the original). While it is clear that *Weissgerber* does disclose the possibility of using two or more vinyl ester monomers (Col. 1, line 56: “vinyl ester(s)”; all Examples), he nowhere discloses use of a vinyl ester of Appellants’ first class and a vinyl ester of Appellants’ second class.

A vinyl ester of α -branched tertiary C₁₀ carboxylic acids is disclosed by *Weissgerber* as a preferred species of the genus of versatic acid esters.⁶ However, *Weissgerber* fails to disclose that the genus of versatic acid vinyl esters is preferred; *Weissgerber* discloses only that when vinyl versatates are employed, it is the C₁₀ ester species of this non-preferred genus which is preferred when a member of the genus is used at all.⁷ In each of *Weissgerber*’s examples, only vinyl acetate and vinyl laurate (not a vinyl versatate) are employed. Vinyl acetate belongs to Appellants’ first class of vinyl esters: it is not branched, is the vinyl ester of a C₁₋₉ carboxylic acid, and its homopolymers have a Tg > 0°C. (see attached Exhibit 2). Vinyl laurate belongs to neither the first nor the second class of Appellants’ vinyl esters: vinyl laurate is the vinyl ester of a C₁₂ carboxylic acid (thus excluding it from Appellants’ first class of vinyl esters); and its

⁶ Versatic acids are synthetic carboxylic acids of 5 or more carbon atoms. Hereafter, the C₁₀ ester will be referred to by its trade name, VeoVa10, a trademark of Shell Chemical Co.

⁷ Thus, this disclosure clearly does not imply that any vinyl versatate is preferred.

homopolymer has a $T_g > 0^\circ\text{C}$, and it is not branched, thus excluding it from Appellants' second class of vinyl esters.

Moreover, and most importantly, Appellants find no disclosure, contrary to the position of the Office, which states that two vinyl esters, one of Appellants' first class and one of the second class must be used. For example, the preference for VeoVa10 (if versatic acid vinyl esters were to be used at all) does not imply that VeoVa10 be used in combination with a second vinyl ester of a C_{1-9} carboxylic acid whose homopolymers have a $T_g > 0$. *Weissgerber* allows for VeoVa10 to be used as a sole vinyl ester. However, use of VeoVa10 as the sole ester does not meet the claims, which require both a vinyl ester of Appellants' first class as well as a vinyl ester of his second class. *Weissgerber* also allows the use of vinyl acetate alone, vinyl propionate alone, vinyl laurate alone, etc.

There are literally hundreds of possible combinations of vinyl esters possible which do not meet the claim limitations. *Weissgerber* does not disclose use of two vinyl esters, one from each of Appellants' first and second classes, whether by broad language or by example. The disclosure of *Weissgerber* clearly does not disclose the invention within the meaning of 35 U.S.C. § 102 as established by CCPA and Federal Circuit precedent. Reversal of the rejection of the claims under 35 U.S.C. § 102(b) is solicited for this reason.

The subject invention claims also require the absence of alkyl (meth)acrylate monomers. This is the *raison d'être* of the present invention. *Weissgerber* "allows" for not using such monomers, by disclosing and claiming a range of 0% to 25%, preferably 0% to 15% for alkyl acrylates. However, "allowing 0%" is not a disclosure of avoiding such monomers altogether. It is clear that *Weissgerber* prefers to use alkyl acrylates, which are included in each of his examples, in amount of *ca.* 9-10% by weight, thus teaching away from the present invention.

The relationship of volatile alkanol emissions to alkyl acrylate monomer use is not discussed either in *Weissgerber* or any reference of record, to Appellants' knowledge. Thus, avoiding alkyl acrylates to eliminate alkanol emissions is neither taught nor suggested by the art. Appellants have shown in their Examples and Comparative Examples that inclusion of alkyl acrylates leads to alkanol emissions, whereas polymers prepared without such monomers are devoid of such emissions.

While it is recognized that the teachings of the prior art are given their broadest interpretation, it is also clear that the subject invention has achieved a non-obvious result. *Weissgerber* does not prohibit alkyl acrylates; he merely allows them optionally (as he does for other monomers), in amounts of up to 25%. One skilled in the art, without Appellants' disclosure in front of him, would not know how, in view of *Weissgerber*, to produce a polymer devoid of alkanol emissions, particularly as *Weissgerber* actually employs alkyl acrylates in each example, even the Comparative Examples. The rejection is not one for obviousness under 35 U.S.C. § 103(a), but for anticipation. However, it is well established that a reference which does not render an invention obvious does not anticipate within the meaning of 35 U.S.C. § 102. *In re Kalm*, 154 USPQ 10 (CCPA 1967). *Kalm* has been discussed in the Appellants' response of September 17, 2002 (Paper No. 10). This discussion bears repeating substantially verbatim here.

The *Kalm* case is very analogous to the present situation with respect to the absence of alkyl acrylates. In *Kalm*, the prior art reference did not teach or suggest the problem solved, nor the result (depressant action, *cf.* freedom from alkanol emissions). Rather, the compounds described by the prior art were antidepressants (*cf.* alkanol emitters). The structural formula of the prior art defined a limited genus (*cf.* 0-25% alkyl acrylate), and included the claimed compounds within its scope (*cf.* free of alkyl acrylates), were one to make the proper choices of substituents (*i.e.* 0%). The rejection was not under 35 U.S.C. § 103, but under 35 U.S.C. § 102.

Here, a compound *per se* is not involved, but a copolymer. However, analogous to the compounds involved in *Kalm*, here, to produce the claimed copolymer, proper choices of monomers (rather than substituents), must be made.

The Office in *Kalm* had attempted to rely on *In re Petering*, 133 USPQ 275 (CCPA 1962) for the proposition that when the choices are small, a subgenus is described and therefore anticipated by a larger genus.⁸ However, the Court disagreed. The Court cited *In re Rushig*, 145 USPQ 274, 282 (CCPA 1965):

We did not intend our Petering opinion or decision to become a precedent for the mechanistic dissection and recombination of the components of the specific illustrative compounds in every chemical reference containing them, to create hindsight anticipations with the guidance of an applicant's disclosures, on the theory that such reconstructed disclosures *describe* specific compounds within the meaning of section 102.

Noting that the prior art reference (*Siemer*) did not teach or suggest the properties of the claimed compounds (*Kalm*, depressants; here, low emissivity), the Court stated, first, that

it is somewhat difficult for us to comprehend how appellant's compounds may be *unobvious* in view of a reference, yet at the same time be said to be *described* by the same reference as the Patent Office has held here. Necessarily, a description in a reference which is insufficient as a matter of law to render a composition of matter obvious to one of ordinary skill in the art would a fortiori be insufficient to "describe" the composition as that term is used in 35 U.S.C. 102(e), a complete description being but the ultimate or epitome of obviousness.

The Court went on to state:

⁸ This discussion of *Petering* is also relevant to the distinctions between *Weissgerber* and the claim requirements for both first and second vinyl esters of specified characteristics.

It is the position of the Patent Office that the presently claimed compounds fall within the scope of the "genus" disclosed by Siemer.⁹ A cursory inspection of the Siemer reference might lead one to that unwarranted conclusion. The solicitor asks that we look at the specific exemplary compounds of Siemer³ in order to determine the substituents he preferred and to establish the narrow scope of his generic disclosure. We have done so. If any preference of Siemer can be ascertained, it is for compounds . . . [not being claimed].¹⁰

Finally, the Court states:

When one speaks of a "genus" in the chemical arts, one ordinarily speaks of a group of compounds closely related both in structure and in properties. . . . It is quite evident that Siemer never made the present compounds;¹¹ or if he did, he never tested them to determine what effect they would have on the central nervous system, since, if he had, he could not logically have failed to report the seemingly anomalous result appellant has discovered.¹²

Here, Appellants' compositions are for adhesives which generate low emissions. *Weissgerber* does not direct one skilled in the art to such compositions. Rather, *Weissgerber* employs 2-ethylhexylacrylate in each of his adhesives. The presence of 2-ethylhexylacrylate

⁹ *i.e.*, freedom from alkyl acrylates falling within the genus of 0-25% alkyl acrylates.

¹⁰ Which is exactly the situation here. All the Examples of *Weissgerber* employ the alkyl acrylates which the subject invention claims prohibit. With respect to vinyl ester content, none of the *Weissgerber* examples meet the claim limitations with respect to use of both Appellants' first and second classes of vinyl ester monomers.

¹¹ *Weissgerber* never made any alkyl acrylate-free polymer, nor even any acrylate-containing polymer also meeting the vinyl ester requirements of the present claims.

¹² Analogous to *Kalm*, *Weissgerber* never made any polymers which did not include an alkylacrylate. Therefore, he could never appreciate the results achieved by Appellants with respect to emissions.


causes 2-ethylhexanol to be generated over time, something unknown to *Weissgerber*. See page 16 of the present application in this respect.

SUMMARY

Weissgerber does not address or even hint at the problems confronting and solved by Appellants. *Weissgerber* contains no disclosure which meets the legal mandates of 35 U.S.C. § 102 to produce a polymer containing two vinyl esters of different classes as required by Appellants' claims, and freedom from use of alkyl acrylates as well. Rather, *Weissgerber* employed alkyl acrylates in each example. The claimed compositions could only be arrived at from impermissibly picking and choosing among a myriad of choices to arrive at a monomer combination for which no preference is expressed, and to solve a problem which the reference does not even mention. However, such picking and choosing is within the purview of obviousness under 35 U.S.C. § 103, not anticipation under 35 U.S.C. § 102, and is expressly prohibited by *In re Wesslau*, 147 USPQ 391, 393 (CCPA 1965). The rejection of claims 1-16 under 35 U.S.C. § 102 must be reversed.

Respectfully submitted,

HOLGER KUNTLE ET AL.

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IX. APPENDIX - CLAIMS ON APPEAL

1. A low-emission adhesive based on an aqueous, protective-colloid-free polymer dispersion or water-redispersible dispersion powders, obtainable therefrom, of vinyl ester-ethylene copolymers containing free carboxylic acid groups, obtainable by free-radically initiated emulsion polymerization, in aqueous medium and in the presence of at least one emulsifier, of a comonomer mixture comprising

- a) from 5 to 50% by weight of ethylene,
- b) from 20 to 80% by weight of at least one vinyl ester selected from the group consisting of vinyl esters of unbranched or branched carboxylic acids having 1 to 9 carbon atoms whose homopolymers have a glass transition temperature $T_g > 0^\circ\text{C}$,
- c) from 5 to 70% by weight of at least one vinyl ester selected from the group consisting of a vinyl ester of a branched carboxylic acids having 8 to 13 carbon atoms whose homopolymers have a glass transition temperature $T_g < 0^\circ\text{C}$,
- d) from 0.5 to 10% by weight of at least one ethylenically unsaturated monocarboxylic or dicarboxylic acid having 3 or 4 carbon atoms,
- e) from 0 to 10% by weight of at least one ethylenically unsaturated, hydroxyalkyl-functional comonomer,
- f) from 0 to 10% by weight of a further mono- or polyethylenically unsaturated comonomer,

the % by weight being based in each case on the overall weight of the comonomers and adding up to 100% by weight, and the dispersion obtained therewith being dried if desired, wherein said vinyl ester-ethylene copolymers are free of moieties derived from (meth)acrylate alkyl esters.

2. The low-emission adhesive as claimed in claim 1, wherein vinyl esters b) copolymerized are at least one member selected from the group consisting of vinyl acetate, vinyl

propionate, vinyl butyrate, 1-methylvinyl acetate, vinyl pivalate, and vinyl esters of α -branched monocarboxylic acids having 9 carbon atoms.

3. The low-emission adhesive as claimed in claim 1, wherein vinyl esters c) copolymerized are at least one member selected from the group consisting of vinyl 2-ethylhexanoate, vinyl esters of α -branched monocarboxylic acids having 10 or 11 carbon atoms, and vinyl esters of branched monocarboxylic acids having 10 to 13 carbon atoms.

4. The low-emission adhesive as claimed in claim 1, wherein the copolymerized comonomer d) comprises at least one member selected from the group consisting of acrylic acid, methacrylic acid, itaconic acid, fumaric acid, and maleic acid.

5. The low-emission adhesive as claimed in claim 1, wherein the copolymerized comonomer e) comprises at least one member selected from the group consisting of methacrylic and acrylic hydroxyalkyl esters having a C₁ to C₅ alkyl radical.

6. The low-emission adhesive as claimed in claim 1, wherein copolymerized comonomer f) comprises at least one member selected from the group consisting of ethylenically unsaturated carboxamides, ethylenically unsaturated sulfonic acids and their salts, and vinylpyrrolidone.

7. The low-emission adhesive as claimed in claim 1, wherein said vinyl acetate-ethylene copolymer is a copolymer of a) from 10 to 40% by weight of ethylene, b) from 35 to 70% by weight of vinyl acetate, c) from 10 to 45% by weight of Veova10® and/or Veova11®, d) from 2 to 6% by weight of acrylic acid and/or methacrylic acid, e) from 0 to 5% by weight of hydroxyethyl acrylate, and f) from 0 to 2% by weight of acrylamide.

8. A process of adhering a covering to a substrate which comprises applying to at least a portion of at least one of the covering and substrate surfaces, an adhesive-effective amount of the low-emission adhesive of any of claims 1-7, and contacting the surfaces of the covering and the substrate.

9. The process of claim 8 wherein the covering is flooring.

10. The process of claim 8 wherein the covering is a ceiling covering.

11. The vinyl ester-ethylene copolymer of claim 1 having free carboxylic acid groups derived from (meth)acrylic acid.

12. A low-emission adhesive based on an aqueous, protective-colloid-free polymer dispersion or water-redispersible dispersion powders, obtainable therefrom, of vinyl ester-ethylene copolymers containing free carboxylic acid groups, obtainable by free-radically initiated emulsion polymerization, in aqueous medium and in the presence of at least one emulsifier, of a comonomer mixture comprising

- a) from 10 to 40 weight percent ethylene;
- b) from 35 to 70 weight percent vinyl acetate;
- c) from 10 to 45% of one or more vinyl esters of C₁₀₋₁₁ carboxylic acids having a Tg in their homopolymers of 0°C;
- d) from 2-6 weight percent of at least one of methacrylic acid or acrylic acid, the % by weight being based in each case on the overall weight of the comonomers and adding up to 100% by weight, and the dispersion obtained therewith being dried if desired, wherein said vinyl ester-ethylene copolymers are free of moieties derived from (meth)acrylate alkyl esters.

13. A low-emission adhesive based on an aqueous, protective-colloid-free polymer dispersion or water-redispersible dispersion powders, obtainable therefrom, of vinyl

ester-ethylene copolymers, obtainable by free-radically initiated emulsion polymerization, in aqueous medium and in the presence of at least one emulsifier, of a comonomer mixture consisting essentially of

- a) from 5 to 50% by weight of ethylene,
- b) from 20 to 80% by weight of at least one vinyl ester selected from the group consisting of vinyl esters of unbranched or branched carboxylic acids having 1 to 9 carbon atoms whose homopolymers have a glass transition temperature $T_g > 0^\circ\text{C}$,
- c) from 5 to 70% by weight of at least one vinyl ester selected from the group consisting of a vinyl ester of a branched carboxylic acids having 8 to 13 carbon atoms whose homopolymers have a glass transition temperature $T_g < 0^\circ\text{C}$,
- d) from 0.5 to 10% by weight of at least one ethylenically unsaturated monocarboxylic or dicarboxylic acid having 3 or 4 carbon atoms,
- e) from 0 to 10% by weight of at least one ethylenically unsaturated, hydroxyalkyl-functional comonomer,
- f) from 0 to 10% by weight of a further mono- or polyethylenically unsaturated comonomer,

the % by weight being based in each case on the overall weight of the comonomers and adding up to 100% by weight, and the dispersion obtained therewith being dried if desired wherein said vinyl ester-ethylene copolymers are free of moieties derived from (meth)acrylate alkyl esters.

14. The vinyl ester-ethylene copolymer of claim 13, wherein said vinyl ester whose homopolymers have a glass transition temperature $T_g > 0^\circ\text{C}$ are selected from the group consisting of vinyl acetate, vinyl propionate, vinyl butyrate, and mixtures thereof.

15. The vinyl ester-ethylene copolymer of claim 13, wherein said vinyl ester whose homopolymers have a glass transition temperature $T_g < 0^\circ\text{C}$ are selected from the group consisting of vinyl esters of 2-ethylhexanoic acid, α -branched monocarboxylic acids having 10 or

11 carbon atoms and vinyl esters of branched monocarboxylic acids having 10-13 carbon atoms, and mixtures thereof.

16. The vinyl ester-ethylene copolymer of claim 14, wherein said vinyl ester whose homopolymers have a glass transition temperature $T_g < 0^\circ\text{C}$ are selected from the group consisting of vinyl esters of 2-ethylhexanoic acid, α -branched monocarboxylic acids having 10 or 11 carbon atoms and vinyl esters of branched monocarboxylic acids having 10-13 carbon atoms, and mixtures thereof.